

Within Limits

On computation and constraint

Conversations about computation have gone feral. Computational talk, and particularly of late, AI, is difficult to avoid. And while what AI is, who it will benefit, and how it might change the world is a vast discursive space – populated by anyone from world imploding doomers to proselytizing evangelists – what is striking in these discussions is a common assumption about scale. The promise of computational feats lies, for the most part, in their scale: vast input resources, working off innumerable servers, processing unimaginable quantities of data.

In October 2024, the Danish King, the Minister of Business and Finance, and various titans of industry looked proudly on as Gefion – Denmark’s new AI supercomputer – was ‘switched on’. A public-private partnership incorporating the Danish state, industry, and research, Gefion is powered by over 1,500 Nvidia GPUs to develop a national AI infrastructure and ecosystem.

The supercomputer is one way of doing computation. A collaborative, intensive pooling of resources and effort to overcome a hitherto roadblock on the Danish AI landscape; sufficient computing power. The scalar vision is clear, big, powerful, accelerated computation is key in approaching many of society’s grand challenges: “supercharging Danish scientists to drive advancements in, for example, life sciences, climate research and quantum computing.”

This installation works as a counterpoint to such imaginaries. Think of it as an experiment, both a provocation and a proposition. As an experiment it asks if there might be alternate ways of doing computation beyond the expansive scalar ideologies of AI and supercomputational practices. In probing this provocative question, it proposes an alternate imaginary: constrained computing.

But first let us probe the term constraint a little.

Not to put too fine a point on it, we don't do constraint very well. Much of the material and social infrastructures of contemporary western existence are predicated on the need – or more strongly – the right, of the liberal subject to be unconstrained. Think about the cycle of globally interconnected economic systems that augment and facilitate our capacity to live however (and wherever) we want: making, using, and disposing of resources at will. The only 'relevant' constraint here is the individual's capacity to earn money and spend it. And while in our highly stratified world this is a functional constraint for many, it is merely an ideological fig leaf for those with vast resources to spend.

Such forms of unconstrained existence are undergirded by technologies (industrial production, communications systems, technologies of warfare, and so forth). And despite much rhetoric to the contrary, our digital technologies enable a vast amplification of these tendencies, delivering the non-stop, round the clock 'rights' of individuals to live freely and expressively. 24/7 energy, 24/7 consumption, 24/7 on-ness. So, while technologies can enforce constraints – borders, for instance – far more often, they are put in the service of overturning them, especially if they stand in the way of consumption and profit-making.

Perhaps slightly less intuitive, but nonetheless powerful, is the idea that much of the political architecture of western modernity works against the idea of constraint. Think for a moment how mainstream economic policy terms (growth, progress, and development) are not just dominant categories for measuring forms of socio-economic worth but are very much connected to a particular imaginary of the western liberal subject as a free and autonomous being. The very concepts that outline the contours of this subject are coterminous with ideas of the unconstrained self, be it as citizen or consumer. We have rights more than we have duties, for instance. Here we see a recursive relation between the political concepts that infuse the infrastructures of capitalism and the forms of life that contemporary capitalism values and sustains. In implying a lessening of a state of affairs – less material goods, less desire, less opportunity – and not more of them, constraint is anathema to a particular understanding of western existence.

But as many who have gone before have argued, constraint can also be enabling. In his book *Less is More* Jason Hickel outlines a strong mandate for the principle of degrowth. Here doing less in the traditional liberal sense of, for example, less work, less producing, less consuming, and so forth, is not a debilitating loss of self, but instead a means of producing a cornucopia of mores: more time with family, more (and better) quality environments, more health, more life satisfaction. In essence, more thriving.

In his book, the logic of sufficiency, Thomas Princen describes a series of compelling community projects where people have adopted the principle of constraint as a political tenet. Doing so doesn't translate into abstinence, sacrifice, or deprivation, but, in fact, their inverse: well-thought-out limitations upon particular practices (for example, the number of cars in a city or timber logging) afford other modalities of living that produce more of what philosophers call the good life.

Guardian columnist and author, George Monbiot, invites us into a thought experiment: instead of dwelling within a destructive habitus that valorizes private wealth at the expense of public goods, what if we dared to reimagine an inverted order consisting of private sufficiency and public wealth. Thinking with constraint offers one way out of the liberal bind that constitutes it as a negative existential position.

But what might constitute technological constraint? As David Nye reminds us, technology is more often associated with the sublime, a quasi-religious sentiment manifested in material form as progress. In climate contexts, renewable technologies are oftentimes invoked as savior: as that which can infuse green transitions with the necessary tools of change. This is no different in the world of IT and digital technologies. Exuberant claims are rampant: digital technologies are seen as salvational. In all of these examples, technology is in the 'awe-making' business: a business far removed from constraint.

One of the provocations enjoined to this installation is the proposal to dare to imagine the idea of constraint outside its liberal enclosures, re-orientating our axis of understanding towards what constraint affords rather than what it negates. In mounting a small solar powered computer on ITUs roof, this installation constrains the IT architecture that supports it. In a sense, this is cloud(y) infrastructure: if the weather turns, computation delays, if cold fronts move in, the battery depletes, if such conditions remain, the server goes offline. It brings the inclemency of the weather into direct relation with our digital habits, an almost unthinkable proposition.

But constraint also activates; collaboration, aesthetics, function, futures, all conjoin in a surge of possibilities. In working with

constraint, we learn more about this server, our desires for it to live on, to find a foothold in institutional life, to support research, to motivate students. So, it too, claims promissory territory, but these are not the imperial promises of Gefion. Here we see careful promises, probing the not yet alt-futures of computation.

Meekly humming atop the roof, the fragile solar server continues to deliver our cloud(y) infrastructure. Inside ITU's atrium, its curatorial other blinks whenever its webpage is graced, clicked, refreshed, or just minimally paid attention to. The various sculptures – molten dipped aluminum hard drives decommissioned by ITU – probe our data storage ideologies: what data do we cherish, what can we live without? At the same time these distorted drives speak to a constrained infrastructural aesthetic. In voices of alchemy and uncertainty they ask about our server's beauty, its hope, its vulnerability, its transformational possibilities.

But look up, clouds are rolling in, batteries are running low. Our experiment is glitching, teetering on the brink of dissolution. But only for now. Soon it will be different, and we can regenerate. Practicing constraint begs a resilience we do not yet possess, in our practices, in our patience, and in how we care for our not-yet alt computational worlds.

James Maguire, March, 2025